APRIL/MAY 2024

CEL31 — PHYSICS OF MATERIALS

Time : Three hours Maximum : 75 marks

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SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is metallic bond?
2. Write down the seven crystal system.
3. Mention the features of powder method.
4. Write the Bragg's law.
5. Define mean free path.
6. What is electrical conductivity?
7. What is hole current?
8. State the Law of mass action.
9. Define drift velocity.
10. What is Hall co-efficient?

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SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Classify and explain the types of bonds in crystals.

Or

(b) Describe the Bravais lattice.

12. (a) Discuss the Laue's method.

Or

(b) Discuss the powder crystal method.

13. (a) Write a short note on Fermi level and Fermi energy.

Or

(b) Obtain the ratio between the electrical conductivity and thermal conductivity.

14. (a) Outline the intrinsic semiconductors.

Or

(b) Describe the electron and hole concentration in intrinsic semiconductor.

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15. (a) Explain the drift velocity and mobility of charge carriers.

Or

(b) Obtain the expression for potential barriers and width of depletion region.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain seven crystal system.

17. Describe the Bragg spectrometer.

18. Discuss the Drude-Lorentz theory.

19. Discuss the classification of solids based on energy band.

20. Explain the experimental determination of Hall coefficient.

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